Kept as California Rare Plant Rank 3.2 in CNPS Inventory on September 4, 2013

Rare Plant Status Review: *Hordeum intercedens*

Proposed Retention as ~~Change from~~ California Rare Plant Rank 3.2, G3G4 / S3S4 ~~to 4.2, G3G4 / S3S4~~

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Changes made to the original document appear in blue text.

Background

Hordeum intercedens is an annual herb in the Poaceae. It was first included in the CNPS Inventory in 1994 (5th Edition) and is currently included as a California Rare Plant Rank (CRPR) 3.2 taxon. *Hordeum intercedens* is distributed from California's Central Coast and San Joaquin Valley to the Channel Islands and northwestern Baja California. It is recognized in *The Jepson Manual* (Barkworth 1993), *The Jepson Manual, Second Edition* (Smith 2012; available online at http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=28385), and the *Flora of North America*, Vol. 24 (von Bothmer et al. 2007). Whereas most plants are placed on CRPR 3 due to taxonomic problems (CNPS 2013), *H. intercedens* was placed on CRPR 3 due to a paucity of information on its distribution and abundance (D. Tibor pers. comm. 1997), as it can often be misidentified as *H. depressum* (A. Sanders pers. comm. 2013). Current data suggest that *H. intercedens* is more common than previously thought, but threatened and possibly in decline throughout much of the mainland portion of its range.

Prior to the original description of *H. intercedens* by Nevski in 1941, the plants had been assigned to *H. pusillum.* The old name was upheld in some later treatments, such as Munz and Keck (1959), which did not recognize *H. intercedens* as occurring in California. Later molecular work (Blattner 2006, Jakob and Blattner 2006), morphological studies (Baum and Bailey 1988), and hybridization experiments (von Bothmer et al. 1985) confirmed the distinctiveness of *H. intercedens* from *H. pusillum*, *H. depressum,* and *H. euclaston* (a South American taxon from which *H. pusillum* was derived) (Blattner 2006). *Hordeum intercedens* is separated from *H. pusillum* by its shorter lemmas of the lateral spikelet (with some overlap in this character). The lateral spikelets of *H. intercedens* are usually unanwned, or rarely with awns up to 1.2 mm long (vs. *H. pusillum*, which has awns up to 1.8 mm long). Also, the leaf sheaths of *H. intercedens* have stripes of hairs, while those of *H. pusillum* do not (von Bothmer et al. 2007). In central California, however, *H. intercedens* is nearly glabrous, causing the morphology to approach that of *H. pusillum* (von Bothmer et al. 1985, 1991). This variation in morphology could indicate a past hybridization with *H. pusillum*, as the two can produce offspring to the F_2 generation, whereas no other interspecies crosses within this section of the genus could (von Bothmer et al. 1985, 1991). *Hordeum intercedens* is separated from *H. depressum* by its glumes of the central spikelet, which are distinctly flattened at the base. *Hordeum depressum* has glumes that are setaceous to slightly flattened at the base (von Bothmer et al. 2007). Additionally, *H. intercedens* has hairy nodes, while *H. depressum* has glabrous nodes (Smith 2012).

As noted earlier, *Hordeum pusillum* does not co-occur with *H. intercedens. Hordeum pusillum* is native to North America and occurs in almost all U.S. States, but was not indicated as occurring in California by Smith (2012) and NatureServe (2013). Von Bothmer et al. (2007) include *H. pusillum* for California; it has been introduced into the state for agricultural experiments in Davis and Berkeley (see *Crampton UCD85669*, *Crampton UCD85668* and *Kennedy UCD85670* in the Consortium of California Herbaria, CCH 2013), so it is possible that it occurs in natural areas of the state. *Hordeum depressum*, on the other hand, is definitively known to occur in California, and can co-occur with *H. intercedens* on the mainland (Baum and Bailey 1990). Apparently these two species can hybridize in parts of Riverside County (F. Roberts pers. comm. 2013).

Although *H. intercedens* has not been recognized in some past treatments, and can be easily confused with *H. depressum*, its distribution and abundance as determined from records in the CCH (2013) should be fairly accurate. Only seven specimens of *H. pusillum* are listed for California in the CCH (2013); the four specimens that are not from agricultural experiments are duplicates of *H. intercedens* specimens, and should be treated as such. There are 342 specimens currently identified as *H. depressum* in the CCH (2013). Some of these are certainly misidentified specimens of *H. intercedens*, but the converse is probably also true (F. Roberts pers. comm. 2013). However, the specimens at the Rancho Santa Ana Botanic Garden and University of California, Riverside Herbaria have been reviewed by experienced botanists familiar with these taxa (D. Bramlet pers. comm. 2013), so the specimens at those herbaria should be considered accurate. Additionally, all *H. depressum* collections from the Channel Islands belong to *H. intercedens*, as *H. depressum* does not grow there (Smith 2012).

Reiser (1991) predicted that *H. intercedens* may be more common than indicated by its number of collections. The currently available data at least partially support that prediction: there are currently about 150 known occurrences of *H. intercedens* in California, distributed across 69 different 7.5' USGS Quadrangles, thirteen counties, and all eight Channel Islands. No data could be found to support its inclusion in the El Monte or Tres Pinos quadrangles, which are currently listed for *H. intercedens* in the CNPS Inventory; these quadrangles will be removed from its CNPS Inventory record until/if we receive verification for them. The majority of the mainland California occurrences are found from San Diego to Santa Barbara counties. A few disjunct collections have been made in the San Joaquin Valley, Central Coast, Sierra Nevada, and Great Basin (CCH 2013, CNDDB 2013). Most of the data on this plant come from herbarium specimens (CCH 2013) and surveys by the Soil Ecology and Restoration Group (Howe 2013), and there is little data regarding population sizes or occurrence quality. Nineteen occurrences (13% of the total) include modifiers noting that *H. intercedens* is locally common or abundant. The largest known occurrence (EO #29) is located in Riverside County west of Hemet, and contained about 20 million individuals as of 2006 (Caltrans 2013). Although some very large occurrences exist, the majority of known mainland occurrences are rather small, often with 50 or fewer individuals (F. Roberts and D. Bramlet pers. comm. 2013). Population sizes can vary dramatically from year to year, with much higher numbers in wetter years (Junak et al. 1996). Most

occurrences (95, or 63% of the total) have been recently documented. Also, at least about 56% of the occurrences are found on land where they should receive some degree of protection, such as Land Trust properties, National Parks, State Parks, and Department of Defense lands.

While the number of occurrences and individuals may seem to indicate that *H. intercedens* is too common for inclusion in the CNPS Inventory, increasing threats on the mainland could warrant its inclusion on CRPR 4 (D. Bramlet, F. Roberts, A. Sanders pers. comms. 2013). *Hordeum intercedens* is found in its greatest abundance in Riverside County (Hemet, Upper Salt Creek, and San Jacinto River areas), but it faces a multitude of threats there, including agricultural and other development, land use practices (disking and manure dumping), invasive species (D. Bramlet and F. Roberts pers. comm. 2013), and highway construction (Caltrans 2013). According to D. Bramlet (pers. comm. 2013), the greatest threat to *H. intercedens*, at least on the mainland, is the type conversion from species-rich alkaline grassland to a monoculture of *Hordeum marinum* subsp. *gussoneanum* (Mediterranean barley). *Hordeum intercedens* generally grows in alkaline grasslands, vernal pools, and in dry, saline streambeds, roughly the same habitats where *H. depressum* is found (Smith 2012). On the Channel Islands, *H. intercedens* can be found in several other habitats, including coastal bluffs, coastal scrub, and stabilized sand dunes (Junak 1996). Much of the alkaline grassland and vernal pool habitat in Southern California has already been lost (Reiser 2001), and in the early 1980's, R. von Bothmer and his coworkers were unable to locate many of the historical populations of *H. intercedens* represented in herbaria (von Bothmer et al. 1991; S. Junak pers. comm. 1992). Populations near Santa Barbara are presumed extirpated, and it is suspected that other mainland populations have met with the same fate (S. Junak pers. comm. 1992).

Threats to *H. intercedens* plants on the Channel Islands and Baja California are less well-known. The plant could potentially be threatened by herbivory on some islands, although this threat has been removed from San Clemente Island, where *H. intercedens* is common on upland flats (first and second author pers. obs. 2012). The invasive *H. marinum* subsp. *gussoneanum* occurs on at least four Channel Islands (San Clemente, San Nicolas, Santa Cruz, and Santa Rosa) (CCH 2013), so this taxon could pose a threat to *H. intercedens* on the islands as well. In 1991, von Bothmer et al. noted that it was still common in Baja California, although only seven specimens from Baja California were found in a search of SEINet (2013). More recent data would be needed to better determine its current status there.

Based on the available information, CNPS and CNDDB recommend maintaining ~~re-ranking~~ *Hordeum intercedens* as ~~from~~ CRPR 3.2~~ to 4.2~~. Although it has a fairly widespread distribution and great abundance in portions of its range, its current threats, presumed extirpation of many occurrences, and possibility of being in decline indicate that it should possibly be included in the CNPS Inventory as a CRPR 1B~~ 4~~ taxon~~ at this time~~. However, more information on the identification and status of the majority of its occurrences is needed prior to making this determination.

Recommended Actions
CNPS: Keep ~~Re-rank~~ *Hordeum intercedens* as ~~from~~ CRPR 3.2 ~~to CRPR 4.2~~
CNDDB: Keep *Hordeum intercedens* at G3G4 / S3S4

Current CNPS Inventory Record
Hordeum intercedens Nevski
vernal barley
Poaceae
CRPR 3.2
Anacapa Island, Fresno, Kings, Los Angeles, Mono, Orange, Riverside, Santa Barbara, Santa Barbara Island, San Benito, San Clemente Island, Santa Catalina Island (SCT), Santa Cruz Island, San Diego, San Miguel Island, San Mateo, San Nicolas Island, Santa Rosa Island, Ventura
Baja California
Potrero (009D) 32116E5, San Clemente (052A) 33117D5, Dana Point (052B) 33117D6, Winchester (068A) 33117F1, El Toro (070B) 33117F6, San Juan Capistrano (070C) 33117E6, Tustin (071A) 33117F7, Laguna Beach (071D) 33117E7, Black Star Canyon (087C) 33117G6, Venice (090B) 33118H4, Los Angeles (110C)**?** 34118A2, El Monte (110D)**?** 34118A1, Newbury Park (113B) 34118B8, Santa Barbara (142B) 34119D6, Vanguard (336C) 36119C8, Ciervo Mtn. (339A) 36120D5, Tres Pinos (385D) 36121G3, Anacapa Island (ANAC) 33119H3, Santa Barbara Island (SBRA) 33118D8, San Clemente Island Central (SCMC) 32118G4, San Clemente Island North (SCMN) 32118H5, San Clemente Island South (SCMS) 32118G3, Santa Catalina East (SCTE) 33118C3, Santa Catalina South (SCTS) 33118C4, Santa Catalina West (SCTW) 33118D5, Santa Cruz Island A (SCZA) 33119H7, Santa Cruz Island B (SCZB) 33119H6, Santa Cruz Island C (SCZC) 33119H5, Santa Cruz Island D (SCZD) 33119H4, San Miguel Island West (SMIW) 33120H4, San Nicolas Island (SNIC) 33119B4, Santa Rosa Island South (SROS) 33120G1
Coastal dunes, coastal scrub, valley and foothill grassland (saline flats and depressions), vernal pools; elevation 5-1000 meters.
Annual herb. Blooms March to June.
In review. Move to List 1B? Location and rarity information needed, especially quads for MNO, and SMT counties. Most mainland occurrences have been extirpated by development; others are threatened. Previously confused with *H. pusillum*. See *Acta Inst. Bot. Acad. Sci. U.R.S.S.* Ser. 1, Fasc. 5: 222 (1941) for original description and *Nordic Journal of Botany* 2:307-321 (1982) for taxonomic treatment.
(Available online at http://www.rareplants.cnps.org/detail/1696.html)

Revised CNPS Inventory Record
Hordeum intercedens Nevski
vernal barley
Poaceae
CRPR 3.2 ~~4.2~~
Anacapa Island, Fresno, Kern, Los Angeles, Merced, Nevada, Orange, Riverside, Santa Barbara*, Santa Barbara Island, San Benito, San Clemente Island, San Mateo, Santa

Catalina Island, Santa Cruz Island, San Diego, San Miguel Island, San Mateo, San Nicolas Island, Santa Rosa Island, Ventura
Baja California
Potrero (009D) 3211655, Otay Mesa (010C) 3211658, National City (011A) 3211761, Jamul Mountains (010B) 3211668, Point Loma (011B) 3211762, Poway (022A) 3211781, Del Mar (022B) 3211782, La Jolla (022C) 3211772, La Mesa (022D) 3211771, Santa Ysabel (033C) 3311616, San Marcos (035B) 3311722, San Luis Rey (036A) 3311723, Encinitas (036D) 3311713, Fallbrook (051A) 3311743, Margarita Peak (051B) 3311744, Las Pulgas Canyon (051C) 3311734, Morro Hill (051D) 3311733, San Clemente (052A) 3311745, Dana Point (052B) 3311746, San Onofre Bluff (052D) 3311735, Winchester (068A) 3311761, Murrieta (068C) 3311752, Lake Elsinore (069A) 3311763, El Toro (070B) 3311766, San Juan Capistrano (070C) 3311756, Tustin (071A) 3311767, Newport Beach (071B) 3311768, Laguna Beach (071D) 3311757, El Casco (085A) 3311781, Perris (085C) 3311772, Lakeview (085D) 3311771, Black Star Canyon (087C) 3311776, Inglewood (090A) 3311883, Venice (090B) 3311884, Los Angeles (110C) 3411812, Canoga Park (112A) 3411825, Newbury Park (113B) 3411828, Triunfo Pass (113C) 3411818, Santa Barbara (142B)* 3411946, Whitaker Peak (163C) 3411856, Stevens (240C) 3511932, San Luis Obispo (246C) 3512036, Pixley (288A) 3511983, Exeter (333C) 3611932, Monson (334A) 3611943, Vanguard (336C) 3611938, Ciervo Mtn. (339A) 3612045, San Benito Mtn. (339C) 3612036, San Felipe (385B0 3612184, Stevinson (423D) 3712037, Lee Vining (453A) 3711981, Soda Springs (555C) 3912034, Anacapa Island (ANAC) 3311983, Santa Barbara Island (SBRA) 3311848, San Clemente Island Central (SCMC) 3211874, San Clemente Island North (SCMN) 3211885, San Clemente Island South (SCMS) 3211873, Santa Catalina East (SCTE) 3311833, Santa Catalina North (SCTN) 3311844, Santa Catalina South (SCTS) 3311834, Santa Catalina West (SCTW) 3311845, Santa Cruz Island A (SCZA) 3311987, Santa Cruz Island B (SCZB) 3311986, Santa Cruz Island C (SCZC) 3311985, Santa Cruz Island D (SCZD) 3311984, San Nicolas Island (SNIC) 3311924, Santa Rosa Island East (SROE) 3311988, Santa Rosa Island South (SROS) 3312071)
Coastal dunes, coastal scrub, valley and foothill grassland (saline flats and depressions), vernal pools; elevation 5-1000 meters.
Annual herb. Blooms March to June.
~~Previously CRPR 3.2; lacked information on its distribution and abundance.~~ Move to CRPR 1B or 4? Many herbarium specimens of *H. intercedens* are possible misidentifications of *H. depressum*; need annotations. Many mainland occurrences are in decline or possibly extirpated; need field surveys. Threatened by development, habitat loss, road construction, and non-native plants. Previously confused with *H. pusillum*. Similar to *H. depressum*; the two may hybridize in RIV Co. See *Acta Inst. Bot. Acad. Sci. U.R.S.S.* Ser. 1, Fasc. 5:222 (1941) for original description and *Nordic Journal of Botany* 2:307-321 (1982) for taxonomic treatment.

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